Accelerating Team Development: Unobtrusive Assessments of Team Readiness

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Overview

Unobtrusive assessment of team-level cognitive readiness

Think Tank: Team readiness assessment environment

Feedback for team leaders to accelerate readiness

Key Aptima Projects:

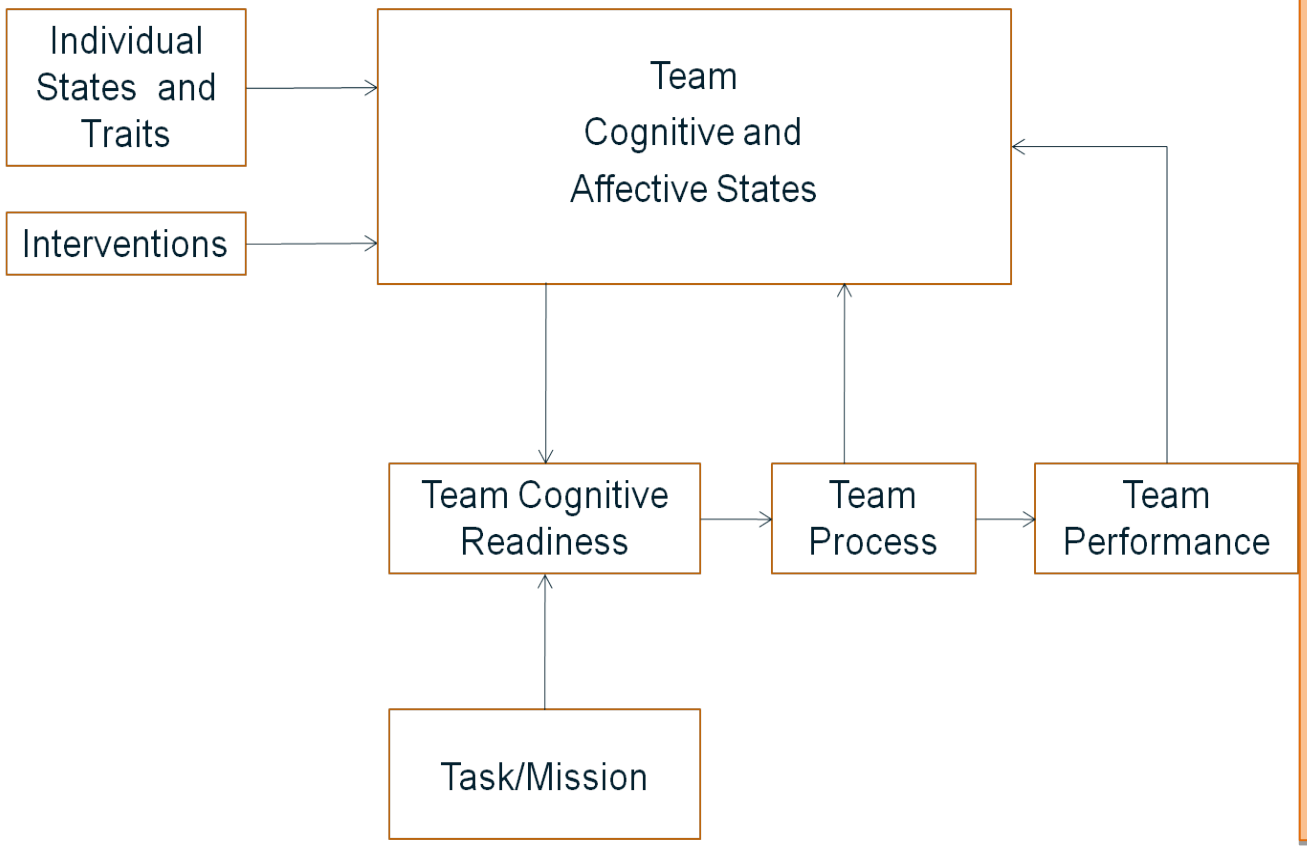
ADS FORCE – PHASE II SBIR (Contract W911QX-12-C-0026, ARL/OSD)

ACCRUE - PHASE IIE SBIR (Contract W91CRB-11-C-0068, DARPA/ARI)

THINK ATO-R (Contract W91WAW-09-C-0058, ARI)

Team States ✉ Cognitive Readiness

ADS FORCE Phase I (2010-2011): Model of Team Cognitive Readiness



Cognitive States:

Shared Mental Models
Shared Situation Awareness
Team Transactive Memory
Strategic Consensus
Team Cognitive Capacity/Load
Team Engagement

Affective States:

Team Cohesion
Team Trust
Team Efficacy
Team Learning Preparedness
Readiness Climate
Team Drive
Team Expertise
Team Emotion

Unobtrusive Measurement of Team States

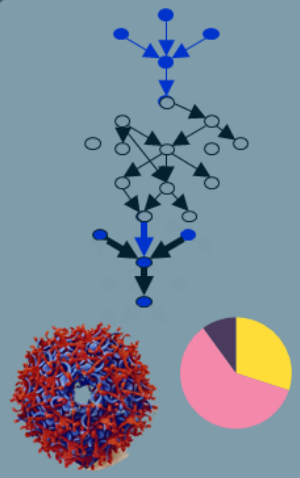
Unobtrusive Assessment Overview

Communication "Sensors"

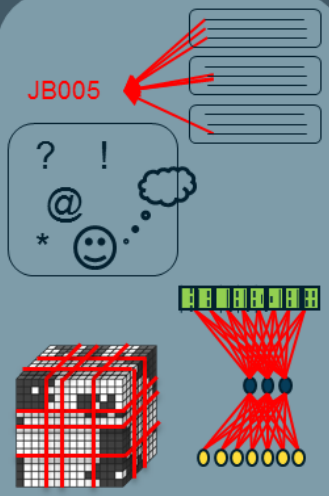
- Email
- Telephone
- Wearable Sensor
- Text Chat
- Instant Messaging
- Radio
- BFT
- CPoF
- Etc.

Performance Measures for Feedback

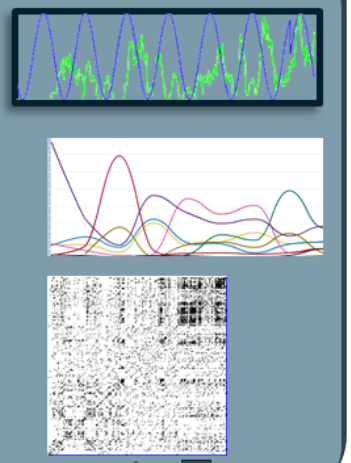
Network



Content



Dynamics



Comms Data Collector (CDC)

Data Storage

- Message information
- Entity information
- Message relationships
- Entity relationships
- Domain Knowledge

- Analysis Results

Communications DB

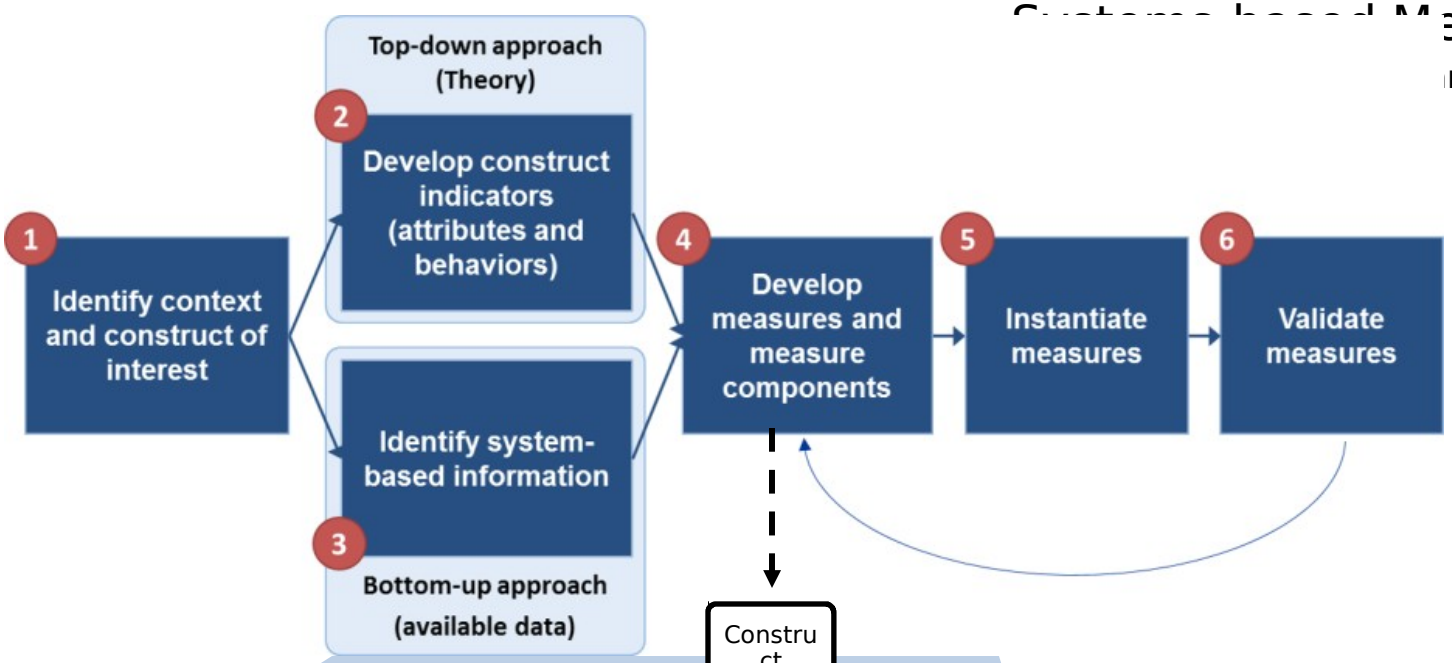
Interface

Visualize, Filter Alert

Unobtrusive Measurement Strategy

RADSM: Rational Approach to Designing
Systems-based Measures

nza (2013)



Shared Situation Awareness Example Item 1: The degree of messages a person is receiving which reference the systems they are using for information sharing

Shared Situation Awareness Example Item 2: The degree to which individuals within a team are sending and receiving dissimilar information

Team Readiness Assessment Environment

ADS FORCE II

PI: Zachary Horn, Aptima

TPOC: Dan Cassenti, ARL HRED

Think Tank: Team Assessment Environment

What happens in the "Think Tank"?

Interact with avatars in an online meeting

- Team meetings (planning, briefs, etc.)
- Course lessons/discussions
- Scenario-based discussions

Automated Measures of Team States

Aptima's ACCRUE measurement suite

**Generalizable across domains, content*

- Tracks voice/chat: content, length, etc.
- Identifies social network & team patterns
- Measures states with latest team science

Result: Team Profile

Empirical metrics of team readiness

- Results for each team state
- Readiness for different tasks/workflows
- Tips for developing key team states

Inferring Readiness from Team States

***Goal:* Help the team leader infer levels of readiness from team state scores**

Cohesion (Affective):

Task Cohesion: Member Contribution, Task Focus, etc.

Social Cohesion: Support, Friendship, etc.

Trust (Affective):

Trust in team's ability, integrity, and benevolence

Shared Understanding (Cognitive):

Shared Mental Models: *Understanding* of mission goals, status, etc.

Shared Situational Awareness: *Understanding* of environment

Team Transactive Memory: *Understanding* of team roles

***Question:* Given scores on cohesion, trust, and shared understanding, how ready is the team for different levels of interdependence (workflow categories; Tesluk et al., 1997)?**

Pooled ("Individual"): Summing individual efforts

Sequential ("Hand-off"): Passing from one to another

Reciprocal ("Back-and-forth"): Team members get multiple iterations

Intensive ("Together"): Collaborating on a joint decision

Team State Criticality for Workflows

Consulted the team literature to identify criticality of Cohesion, Trust, and Shared Understanding for each workflow:

Workflows →	"Individual" (Pooled)	"Hand-off" (Sequential)	"Back and Forth" (Reciprocal)	Together (Intensive)
Cohesion	Optional	Helpful	Critical	Critical
Trust	Critical	Critical	Critical	Critical
Shared Understanding	Optional	Helpful	Critical	Critical

Instructions to Leaders:

1. Decide which workflow(s) represents anticipated team tasks (performance episodes)
2. Identify the most critical team states for each workflow
3. Verify/improve readiness given scores on those critical team states

Home
Team Details

Team Alpha

Angela Seldin (Leader) | Sherrie Friedman | Maria Pozzi | Carol Hu | Tricia Bradley

Overview | Shared Understanding | Cohesion | Trust | Confidence

Current Levels

Shared Understanding

Cohesion

Trust

Confidence

Workflow Readiness

Show Legend

How will team members accomplish the task?

	Individual	Handoff	Back and Forth	Together
Shared Understanding	●	◑	◑	◑
Cohesion	◑	○	○	○
Trust	○	○	○	○
Confidence	◑	○	○	○

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Current Level of Shared Understanding

[Why?]

Workflow Readiness

Show Legend

Readiness at this level of Shared Understanding:

[Why?]

Tips To Build Shared Understanding

- Establishing clear goals and norms with the team as a group. Since these goals are related to tasks, it also ensures that everyone is on the same page and understands the tasking and who to approach
- Discussing past experiences and errors related to your team tasks. When you discuss how you handled things in the past and dealt past errors, one begins to identify who in the team is capable of performing those tasks. Thus, when a similar task is faced, they know who the "go to" person is
- Discussing the similarities between team members: shared expertise, education, or task knowledge. Teams that have similarities in these areas are more likely to have shared experiences, which is related to similar ways in which to interpret the environment
- Discussing your areas of expertise, even if it is not similar to

Next Steps

Summer 2014: Validate preliminary unobtrusive measures

- Goal: Construct validation via project team meetings (naturalistic)
- Convergent Validity: compare with self-report measures of same constructs

Fall 2014 to Fall 2015:

- Test the extensibility of these team state measures in live exercises
- Configure for different indicators (e.g., VoIP, text chat, sociometers)
- Use theory (top-down) and data (bottom-up) to refine strategies for measurement, aggregation, and inferences of readiness